

AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions, and listing, of claims in the application.

LISTING OF CLAIMS

1. (Currently Amended) A method for discovering and configuring network devices into a cluster, said method comprising ~~the steps of:~~

automatically detecting discovery packets from candidate devices by receiving discovery packets from the candidate devices, the candidate devices periodically transmitting the discovery packets;

determining whether any of the candidate devices is qualified to join the cluster by applying qualification rules to the said discovery packets received from the said candidate devices; and ~~to determine whether any of said candidate devices is qualified to join said cluster, and~~

adding one or more of the said candidate devices to the said cluster to be managed and configured via a commander network device of the cluster.

1-57. (Cancelled)

58. (New) The method according to claim 1, wherein the candidate network devices transmit the discovery packets to a multicast address.

59. (New) The method according to claim 1, wherein the discovery packets comprise Layer 2 messages.

60. (New) The method according to claim 59, wherein the discovery packets comprise Media Access Control (MAC) Layer messages.

61. (New) The method according to claim 1, wherein the discovery packets include cluster-capability information of the candidate device transmitting the discovery packets.

62. (New) The method according to claim 1, wherein the qualification includes that the candidate device is not an active member of another cluster.

63. (New) The method according to claim 1, further comprising:
maintaining, at each of the candidate devices, a database containing information about neighbor candidate devices.

64. (New) The method according to claim 63, further comprising:
transmitting, in response to said adding, the information about the neighbor candidate information to the commander network device from each member network device which just joined the cluster.

65. (New) The method according to claim 1, further comprising:
presenting to a user a list of the candidate network devices qualified to join the cluster prior to said adding.

66. (New) A method for discovering candidate network devices to be configured into a cluster of network devices and managed via a commander network device, said method comprising:

automatically detecting, at the commander network device, first candidate network devices by receiving discovery packets from the candidate network devices directly connected to the commander network device, the candidate network devices periodically transmitting the discovery packets, the discovery packets including information indicating that the candidate network device is capable of belonging to a cluster;

determining whether any of the first candidate network devices is qualified to join the cluster by applying qualification rules to the discovery packets; and

presenting to a user a list of the first candidate network devices qualified to join the cluster.

67. (New) The method in accordance with claim 66, wherein the discovery packets comprise Layer 2 messages.

68. (New) The method according to claim 66, wherein the qualification includes that the candidate device is not an active member of another cluster.

69. (New) The method in accordance with claim 66, further comprising:
storing the information received from the candidate network devices in a
database of the commander network device.

70. (New) The method in accordance with claim 66, further comprising:
maintaining, at each of the candidate network devices, a neighbor device
database containing information about other candidate network devices directly
connected to the candidate network device.

71. (New) The method in accordance with claim 70, further comprising:
updating, at each of the candidate network devices, the neighbor device
database in response to the discovery packets received from the other candidate
network devices.

72. (New) The method in accordance with claim 70, further comprising:
adding one or more of the first candidate network devices to the cluster,
each of the added first candidate devices becoming a member of the cluster.

73. (New) The method in accordance with claim 72, further comprising:
transmitting, in response to said adding, the neighbor device database
information to the commander network device from member network device
which just joined the cluster.

74. (New) The method in accordance with claim 73, wherein the neighbor device database information is transmitted using user datagram protocol (UDP) packets.

75. (New) The method in accordance with claim 73, further comprising:
automatically detecting, at the commander network device, second candidate network devices connected to the member network device which just joined the cluster, by receiving the neighbor device database information from the member network device.

76. (New) The method in accordance with claim 75, further comprising:
storing the received neighbor device database information in a database of the commander network device.

77. (New) The method in accordance with claim 75, further comprising:
presenting to a user a list of the first and second candidate network devices qualified to join the cluster.

78. (New) A method for discovering candidate network devices to be configured into a cluster of network devices and managed via a commander network device, said method comprising:

periodically transmitting discovery packets from the candidate network devices, the discovery packets including information indicating that the candidate network device is capable of belonging to a cluster;

maintaining, at each of the candidate network devices, a neighbor device database containing information about other candidate network devices directly connected to the candidate network device; and

transmitting the information in the neighbor device database to the commander network device when the candidate network device is added to the cluster.

79 (New) The method in accordance with claim 78, further comprising:

receiving, at each of the candidate network devices, the discovery packets from its neighbor candidate devices; and

updating, at each of the candidate network devices, the neighbor device database in response to the received discovery packets.

80. (New) The method in accordance with claim 78, wherein the discovery packets comprise Layer 2 messages.

81. (New) A commander network device for discovering and configuring network devices into a cluster, said commander network device comprising:

discovery protocol logic adapted to automatically detect candidate devices by receiving discovery packets from the candidate devices, the candidate devices periodically transmitting the discovery packets;

qualification rule circuitry adapted to determine whether any of the candidate devices is qualified to join the cluster by applying qualification rules to the discovery packets received from the candidate devices; and

cluster management logic adapted to add one or more of the candidate devices to the cluster, each of the added network devices becoming a member of the cluster to be managed and configured via the commander network device.

82. (New) The commander network device according to claim 81, wherein the discovery packets comprise Layer 2 messages.

83. (New) The commander network device according to claim 82, wherein the discovery packets comprise Media Access Control (MAC) Layer messages.

84. (New) The commander network device according to claim 81, wherein the discovery packets include cluster-capability information of the candidate device transmitting the discovery packets.

85. (New) The commander network device according to claim 81, wherein the qualification includes that the candidate device is not an active member of another cluster.

86. (New) The commander network device according to claim 81, wherein said discovery protocol logic is further adapted to receive information about neighbor candidate network devices transmitted from a member network device which just joined the cluster, each of the candidate network devices and member network devices maintaining database containing information about their neighbor candidate devices.

87. (New) The commander network device according to claim 81, further comprising:

logic adapted to generate a list of the candidate network devices qualified to join the cluster.

88. (New) A commander network device for discovering candidate network devices to be configured into a cluster, said commander network device comprising:

discovery protocol logic adapted to automatically detect first candidate network devices by receiving the discovery packets from the candidate network devices directly connected to the commander network device, each of the candidate network devices periodically transmitting discovery packets including information indicating that the candidate network device is capable of belonging to a cluster;

qualification rule circuitry adapted to determine whether any of the first candidate network devices is qualified to join the cluster by applying qualification rules to the discovery packets; and

logic adapted to generate a list of the first candidate network devices qualified to join the cluster.

89. (New) The commander network device in accordance with claim 88, wherein the discovery packets comprise Layer 2 messages.

90. (New) The commander network device according to claim 88, wherein the qualification includes that the candidate device is not an active member of another cluster.

91. (New) The commander network device in accordance with claim 88, further comprising:

a database adapted to store the information received from the candidate network devices.

92. (New) The commander network device in accordance with claim 88, further comprising:

cluster management logic adapted to add one or more of the first candidate network devices to the cluster, the added first candidate device becoming a member of the cluster.

93. (New) The commander network device in accordance with claim 88, wherein each of the candidate network devices maintains a neighbor device database containing information about other candidate network devices directly connected to the candidate network device, and

wherein said discovery protocol logic is further adapted to receive information about neighbor candidate network devices from a member network device which just joined the cluster.

94. (New) The commander network device in accordance with claim 93, wherein said discovery protocol logic is further adapted to automatically detect second candidate network devices connected to the member network device which just joined the cluster, in response to the received information about the neighbor candidate network devices.

95. (New) The commander network device in accordance with claim 94, wherein said logic adapted to generate the list further generates a list of the first and second candidate network devices qualified to join the cluster.

96. (New) A network device capable of being configured into a cluster of network devices and managed via a commander network device, said network device comprising:

discovery protocol logic adapted to periodically transmit discovery packets, the discovery packets including information indicating that the network device is capable of belonging to a cluster;

a neighbor device database adapted to store information about other candidate network devices directly connected to the network device, other candidate network devices being capable of configured into a cluster; and

logic adapted to transmit the information in the neighbor device database to the commander network device when the network device is added to the cluster.

97. (New) The network device in accordance with claim 96, wherein said discovery protocol logic further adapted to receive the discovery packets from its neighbor candidate devices, said network device further comprising:

logic adapted to updating the neighbor device database in response to the received discovery packets.

98. (New) The network device in accordance with claim 96, wherein the discovery packets comprise Layer 2 messages.

99. (New) An apparatus for discovering and configuring network devices into a cluster, said apparatus comprising:

means for automatically detecting candidate devices by receiving discovery packets from the candidate devices, the candidate devices periodically transmitting the discovery packets;

means for determining whether any of the candidate devices is qualified to join the cluster by applying qualification rules to the discovery packets received from the candidate devices; and

means for adding one or more of the candidate devices to the cluster to be managed and configured via a commander network device of the cluster.

100. (New) The apparatus according to claim 99, wherein the candidate network devices transmit the discovery packets to a multicast address.

101. (New) The apparatus according to claim 99, wherein the discovery packets comprise Layer 2 messages.

102. (New) The apparatus according to claim 101, wherein the discovery packets comprise Media Access Control (MAC) Layer messages.

103. (New) The apparatus according to claim 99, wherein the discovery packets include cluster-capability information of the candidate device transmitting the discovery packets.

104. (New) The apparatus according to claim 99, wherein the qualification includes that the candidate device is not an active member of another cluster.

105. (New) The apparatus according to claim 99, further comprising:
means for maintaining, at each of the candidate devices, a database containing information about neighbor candidate devices.

106 (New) The apparatus according to claim 105, further comprising:
means for transmitting, in response to said addition of a member, the information about the neighbor candidate information to the commander network device from each member network device which just joined the cluster.

107. (New) The apparatus according to claim 99, further comprising:
means for presenting a list of the candidate network devices qualified to join the cluster to a user prior to said addition.

108. (New) An apparatus for discovering candidate network devices to be configured into a cluster of network devices and managed via a commander network device, said apparatus comprising:

means for automatically detecting first candidate network devices by receiving discovery packets from the candidate network devices directly connected to the commander network device, the candidate network devices periodically transmitting the discovery packets, the discovery packets including

information indicating that the candidate network device is capable of belonging to a cluster;

means for determining whether any of the first candidate network devices is qualified to join the cluster by applying qualification rules to the discovery packets; and

means for presenting to a user a list of the first candidate network devices qualified to join the cluster.

109. (New) The apparatus in accordance with claim 108, wherein the discovery packets comprise Layer 2 messages.

110. (New) The apparatus according to claim 108, wherein the qualification includes that the candidate device is not an active member of another cluster.

111. (New) The apparatus in accordance with claim 108, further comprising:
means for storing the information received from the candidate network devices in a database of the commander network device.

112. (New) The apparatus in accordance with claim 108, further comprising:
means for adding one or more of the first candidate network devices to the cluster, the added first candidate device becoming a member of the cluster.

113. (New) The apparatus in accordance with claim 112, wherein each of the candidate network devices maintains a neighbor device database containing information about other candidate network devices directly connected to the candidate network device, and each of the member network devices which just joined the cluster transmits the neighbor device database information to the commander network device.

114. (New) The apparatus in accordance with claim 113, wherein the neighbor device database information is transmitted using user datagram protocol (UDP) packets.

115. (New) The apparatus in accordance with claim 113, further comprising:
means for automatically detecting second candidate network devices connected to the member network device which just joined the cluster, by receiving the neighbor device database information from the member network device.

116. (New) The apparatus in accordance with claim 115, further comprising:
means for storing the received neighbor device database information in a database of the commander network device.

117. (New) The apparatus in accordance with claim 115, further comprising:

means for presenting to a user a list of the first and second candidate network devices qualified to join the cluster.

118. (New) An apparatus for discovering candidate network devices to be configured into a cluster of network devices and managed via a commander network device, said apparatus comprising:

means for periodically transmitting discovery packets from the candidate network devices, the discovery packets including information indicating that the candidate network device is capable of belonging to a cluster;

means for maintaining, at each of the candidate network devices, a neighbor device database containing information about other candidate network devices directly connected to the candidate network device; and

means for transmitting the information in the neighbor device database to the commander network device when the candidate network device is added to the cluster.

119. (New) The apparatus in accordance with claim 118, further comprising:

means for receiving, at each of the candidate network devices, the discovery packets from its neighbor candidate devices; and

means for updating, at each of the candidate network devices, the neighbor device database in response to the received discovery packets.

120. (New) The apparatus in accordance with claim 118, wherein the discovery packets comprise Layer 2 messages.

121. (New) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for discovering and configuring network devices into a cluster, said method comprising:

automatically detecting candidate devices by receiving discovery packets from the candidate devices, the candidate devices periodically transmitting the discovery packets;

determining whether any of the candidate devices is qualified to join the cluster by applying qualification rules to the discovery packets received from the candidate devices; and

adding one or more of the candidate devices to the cluster to be managed and configured via a commander network device of the cluster.

122. (New) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for discovering candidate network devices to be configured into a cluster of network devices and managed via a commander network device, said method comprising:

automatically detecting, at the commander network device, first candidate network devices by receiving discovery packets from the candidate network

devices directly connected to the commander network device, the candidate network devices periodically transmitting the discovery packets, the discovery packets including information indicating that the candidate network device is capable of belonging to a cluster;

determining whether any of the first candidate network devices is qualified to join the cluster by applying qualification rules to the discovery packets; and
presenting to a user a list of the first candidate network devices qualified to join the cluster.

123. (New) The program storage device in accordance with claim 122, wherein said method further comprises:

adding one or more of the first candidate network devices to the cluster, each of the added first candidate devices becoming a member of the cluster.

124. (New) The program storage device in accordance with claim 122, wherein said method further comprises:

storing the information received from the candidate network devices in a database of the commander network device.

125. (New) A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for discovering candidate network devices to be configured into a cluster

of network devices and managed via a commander network device, said method comprising:

periodically transmitting discovery packets from the candidate network devices, the discovery packets including information indicating that the candidate network device is capable of belonging to a cluster;

maintaining, at each of the candidate network devices, a neighbor device database containing information about other candidate network devices directly connected to the candidate network device; and

transmitting the information in the neighbor device database to the commander network device when the candidate network device is added to the cluster.

126. (New) The program storage device in accordance with claim 125, wherein said method further comprises:

receiving, at each of the candidate network devices, the discovery packets from its neighbor candidate devices; and

updating, at each of the candidate network devices, the neighbor device database in response to the received discovery packets.